AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. (Currently Amended) A device for producing a radioisotope from a target fluid irradiated with a beam of accelerated charged particles, the device including a circulation circuit comprising:

an irradiation cell comprising a metallic insert and a cavity, the cavity effective for receiving the target fluid;

a pump effective for generating flow of the target fluid and circulating the target fluid inside the circulation circuit;

an external heat exchanger; and

a pressurizing device ~~for pressurizing~~ which pressurizes the circulation circuit,

wherein the pump and the external heat exchanger form an external cooling device effective for cooling the target fluid and configured to retain the target fluid inside the cavity during irradiation essentially in the liquid state ~~during irradiation~~.

2. (Previously Presented) The device according to claim 1, wherein the pump generates a flow rate sufficient to keep the target fluid at a mean temperature below 130° C.

3. (Previously Presented) The device according to claim 1 wherein the pump generates a flow rate greater than 200 ml/minute.

4. (Previously Presented) The device according to claim 3, wherein the pump generates a flow rate greater than 500 ml/minute.

5. (Previously Presented) The device according to claim 1, wherein the cavity is configured to contain a volume of target fluid of between 0.2 and 5.0 ml.

6. (Previously Presented) The device according to claim 1, wherein the overall volume of the target fluid in the circulation circuit is less than 20 ml.

7. (Previously Presented) The device according to claim 1, wherein the irradiation cell further comprises an inlet and outlet to provide inflow and outflow of the target material, wherein the inlet and outlet are configured to create a vortex in the flow of the target fluid inside the cavity.

8. (Previously Presented) The device according to claim 7, wherein one of the inlet or the outlet is positioned essentially tangentially to the cavity.

9. (Previously Presented) The device according to claim 11, wherein the inlet and the outlet are located at the lateral surface of the cavity on the same meridian.

10. (Previously Presented) The device according to claim 7, wherein the irradiation cell further comprises an irradiation window and wherein the inlet is arranged so that the target fluid inflow is directed at a impact point of the accelerated charged particle beam in the irradiation window so that the inflow hits the window head-on with the beam.

11. (Previously Presented) The device according to claim 1, wherein the cavity has a central axis around which a lateral surface is developed, the outlet being connected to the lateral surface and the inlet being along the central axis.

12. (Previously Presented) The device according to claim 1, wherein the irradiation cell further-comprises an internal cooling device effective for cooling the target material.

13. (Previously Presented) The device according to claim 12, wherein the internal cooling device comprises a double-walled jacket surrounding the cavity.

14. (Previously Presented) The device according to claim 12, wherein the internal cooling device provides indirect cooling of the cavity.

15. (Previously Presented) The device according to claim 1 further comprising a Helium-based cooling device for cooling the irradiation window of the irradiation cell.

16–20. (Cancelled)

21. (Previously Presented) A method for manufacturing a radiopharmaceutical compound, the method comprising utilizing the device according to claim 1.

22. (Previously Presented) The device according to claim 3, wherein the pump generates a flow rate greater than 1000 ml/minute.

23. (Previously Presented) A device for producing a radioisotope from a target fluid irradiated with a beam of accelerated charged particles, the device including a circulation circuit comprising:

an irradiation cell comprising an irradiation window and a metallic insert having a housing including a lateral wall portion and a second wall portion, the

housing including at least one inlet and at least one outlet to provide inflow and outflow of the target material, the irradiation window located opposite the second wall portion, and a cavity for receiving the target fluid located between the lateral wall portion, second wall portion, and irradiation window;

a pump for generating flow of the target fluid at a rate greater than 200 ml/minute and circulating the target fluid inside the circulation circuit;

an external heat exchanger; and

a pressurizing device for pressurizing the circulation circuit,

wherein the pump and the external heat exchanger form an external cooling device effective for cooling the target fluid and configured to retain the target fluid inside the cavity essentially in the liquid state during irradiation.

24. (Previously Presented) The device according to claim 23, wherein the pump generates a flow rate sufficient to keep the target fluid at a mean temperature below 130° C.

25. (Previously Presented) The device according to claim 23, wherein the pump generates a flow rate greater than 500 ml/minute.

26. (Previously Presented) The device according to claim 23, wherein the inlet and outlet are configured to create a vortex in the flow of the target fluid inside the cavity.

27. (Previously Presented) The device according to claim 23, wherein one of the inlet or the outlet is positioned essentially tangentially to the lateral wall portion.

28. (Previously Presented) The device according to claim 23, wherein the inlet and the outlet are located at the lateral wall portion on the same meridian.

29. (Previously Presented) The device according to claim 23, wherein the inlet is arranged so that the target fluid inflow is directed at a impact point of the accelerated charged particle beam in the irradiation window so that the inflow hits the window head-on with the beam.

30. (Previously Presented) The device according to claim 23, wherein the cavity has a central axis extending from the window to the second wall portion, the outlet being connected to the lateral wall portion and the inlet being along the central axis.

31. (Previously Presented) The device according to claim 23, wherein the irradiation cell further comprises an internal cooling device effective for cooling the target material.